Physics Education Research at CERN
an activity of the Teacher and Student Programmes Section of IR-ECO

Ph.D. Thesis Offer on
Low-Cost Experiments for the Classroom

Description

It is often argued that modern physics cannot be taught on a high school level because of the lack of appropriate classroom experiments. Indeed, most modern physics experiments are too expensive and too complex to be rebuilt and studied in the physics classroom. However, especially recent developments in 3D printing enable educators to develop their own simplified classroom demonstrations or hands-on experiments suitable for high-school students, for example a model of ATLAS toroidal magnet system[1]. Teachers trying to introduce particle physics in their classrooms would benefit greatly from a careful collection of suitable hands-on activities taking into account students' conceptions and physics curricula.

Therefore, the successful candidate will collect and evaluate existing resources and evaluate the demand for modern physics experiments among teachers, using the access of the group to alumni of CERN Teacher Programmes. The successful candidate will drive the selection of a few feasible projects to create 3D-printable low-cost classroom hands-on experiments, develop them together with students and teachers, and evaluate their usage. Results of these investigations and developments shall be published in open access journals to spread the ideas among teachers.

Given the nature of this thesis work, only a cumulative dissertation seems to be feasible.

Training Value

The successful candidate will strengthen his/her teaching skills and develop activities to improve teaching particle physics, with that improve his/her skills in hands-on communication, lesson planning, and international curricula.

Supervision

The thesis will be jointly supervised by a university professor and a supervisor from CERN's Physics Education Research team.

For this thesis, it is possible to propose the university and university professor supervising the thesis.

How to apply?

Applications are handled by CERN HR, please find the application information for CERN's doctoral student programme at http://cern.ch/jobs/join-us/doctoral-student-programme. The application deadline for the current round is October 16th, 2017!

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[1] https://scool.web.cern.ch/classroom-activities/atlas-model

Contact us at teachers-students@cern.ch!